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DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R4–ES–2019–0073; FXES11130900000-189-FF0932000]

RIN 1018–BB83

Endangered and Threatened Wildlife and Plants; Removing *Lepanthes eltoroensis*

From the Federal List of Endangered and Threatened Plants

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: We, the U.S. Fish and Wildlife Service, propose to remove *Lepanthes eltoroensis* (no common name), an orchid species from Puerto Rico, from the Federal List of Endangered and Threatened Plants (List) (i.e., to “delist” the species), due to recovery. This proposed action is based on a thorough review of the best available scientific and commercial data, which indicates that the threats to the species have been eliminated or reduced to the point that the species no longer meets the definition of an endangered or threatened species under the Endangered Species Act of 1973, as amended (Act). We also announce the availability of a draft post-delisting monitoring (PDM) plan. We seek information, data, and comments from the public regarding this proposal and the draft PDM plan.

DATES: We will accept comments received or postmarked on or before **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

Comments submitted electronically using the Federal eRulemaking Portal (see

ADDRESSES, below) must be received by 11:59 p.m. Eastern Time on the closing date.

We must receive requests for a public hearing, in writing, at the address shown in **FOR**

FURTHER INFORMATION CONTACT by [**INSERT DATE 45 DAYS AFTER
DATE OF PUBLICATION IN THE FEDERAL REGISTER**].

ADDRESSES: *Written comments:* You may submit comments on this proposed rule and the draft PDM plan by one of the following methods:

(1) *Electronically:* Go to the Federal eRulemaking Portal:

<http://www.regulations.gov>. In the Search box, enter FWS–R4–ES–2019–0073, which is the docket number for this rulemaking. Then, click on the Search button. On the resulting page, in the Search panel on the left side of the screen, under the Document Type heading, click on the Proposed Rule box to locate this document. You may submit a comment by clicking on “Comment Now!”

(2) *By hard copy:* Submit by U.S. mail or hand-delivery to: Public Comments Processing, Attn: FWS–R4–ES–2019–0073, U.S. Fish and Wildlife Service, MS: JAO/1N, 5275 Leesburg Pike, Falls Church, VA 22041-3803.

We request that you send comments only by the methods described above. We will post all comments on <http://www.regulations.gov>. This generally means that we will post any personal information you provide us (see *Public Comments*, below, for more information).

Document availability: This proposed rule, the draft PDM plan, and supporting documents (including the species status assessment (SSA) report and references cited) are available at <http://www.regulations.gov> under Docket No. FWS–R4–ES–2019–0073 or at

the Caribbean Ecological Services Field Office website at

<https://www.fws.gov/southeast/caribbean/>.

FOR FURTHER INFORMATION CONTACT: Edwin Muñiz, Field Supervisor, U.S. Fish and Wildlife Service, Caribbean Ecological Services Field Office. Physical address: Road 301, Km. 5.1, Boquerón, Puerto Rico 00622. Mailing address: P.O. Box 49, Boquerón, Puerto Rico 00622. Telephone: (787) 851-7297. If you use a telecommunications device for the deaf (TDD), please call the Federal Relay Service at (800) 877- 8339 for TTY assistance 24 hours a day, 7 days a week.

SUPPLEMENTARY INFORMATION:

Information Requested

Public Comments

We intend that any final action resulting from this proposed rule will be based on the best scientific and commercial data available and be as accurate and as effective as possible. The proposed rule serves as the notice of initiation and, if finalized, the final determination fulfills the requirements of a 5-year review. Therefore, we request comments or information from other concerned governmental agencies, the scientific community, industry, or any other interested parties concerning this proposed rule. Because we will consider all comments and information we receive during the comment period, our final determination may differ from this proposal. We particularly seek new information not already included in the species status assessment report concerning:

- (1) Information concerning the biology and ecology of *Lepanthes eltoroensis*;
- (2) New information on the historical and current status, range, distribution, and population size of *L. eltoroensis*;

(3) Relevant data concerning any threats (or lack thereof) to *L. eltoroensis*, particularly any data on the possible effects of climate to this orchid as it relates to habitat;

(4) The extent of protection and management that would be provided by the Commonwealth of Puerto Rico to *L. eltoroensis* as a delisted species;

(5) Current or planned activities within the geographic range of *L. eltoroensis* that may negatively impact or benefit the species;

(6) The draft PDM plan and the methods and approach detailed in it; and

(7) Other relevant information the public believes we have not considered.

Please include sufficient information with your submission (such as scientific journal articles or other publications) to allow us to verify any scientific or commercial information you include. All comments submitted electronically via <http://www.regulations.gov> will be presented on the website in their entirety as submitted. For comments submitted via hard copy, we will post your entire comment—including your personal identifying information—on <http://www.regulations.gov>. You may request at the top of your document that we withhold personal information such as your street address, phone number, or e-mail address from public review; however, we cannot guarantee that we will be able to do so.

Comments and materials we receive, as well as supporting documentation we used in preparing this proposed rule, will be available for public inspection on <http://www.regulations.gov>, or by appointment, during normal business hours, at the U.S. Fish and Wildlife Service, Caribbean Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Please note that submissions merely stating support for, or opposition to, the action under consideration without providing supporting information, although noted, will not be considered in making a determination, as section 4(b)(1)(A) of the Act (16 U.S.C. 1531 *et seq.*) directs that determinations as to whether any species is an endangered or threatened species must be made “solely on the basis of the best scientific and commercial data available.”

Public Hearing

Section 4(b)(5) of the Act provides for a public hearing on this proposal, if requested. Requests must be received within 45 days after the date of publication of this proposed rule in the *Federal Register* (see **DATES**). Such requests must be sent to the address shown in **FOR FURTHER INFORMATION CONTACT**. We will schedule a public hearing on this proposal, if requested, and announce the date, time, and place of the hearing, as well as how to obtain reasonable accommodations, in the *Federal Register* and local newspapers at least 15 days before the hearing.

Peer Review

In accordance with our joint policy on peer review published in the *Federal Register* on July 1, 1994 (59 FR 34270), and the Service’s August 22, 2016, Director’s Memo on the Peer Review Process, we sought the expert opinions of five appropriate and independent specialists regarding the species status assessment report for *Lepanthes eltoroensis*. These peer reviewers have expertise in *L. eltoroensis* or similar epiphytic orchid species’ biology or habitat, or climate change. We received comments from one of the five peer reviewers. The purpose of peer review is to ensure that our decisions are based on scientifically sound data, assumptions, and analyses. The peer reviewer

comments will be available along with other public comments in the docket for this proposed rule.

Species Status Assessment Report

A team of Service biologists, in consultation with other species experts, prepared a species status assessment (SSA) report for *Lepanthes eltoroensis*. The SSA report represents a compilation of the best scientific and commercial data available concerning the status of the species, including the impacts of past, present, and future factors (both negative and beneficial) affecting the species. As stated above, we solicited independent peer review of the SSA report by five individuals with expertise in *L. eltoroensis* or similar epiphytic orchid species' biology or habitat, or climate change. The final SSA, which supports this proposed rule, was revised, as appropriate, in response to the comments and suggestions received from our peer reviewers. The SSA report and other materials relating to this proposal can be found on the Service's Southeast Region website at <https://www.fws.gov/southeast/> and at <http://www.regulations.gov> under Docket No. FWS-R4-ES-2019-0073.

Background

Previous Federal Actions

Lepanthes eltorensis (no common name) was originally recommended for Federal listing by the Smithsonian Institution (Ayensu and DeFilipps 1978). In 1980, we included the species among the plants being considered as endangered or threatened by the Service (45 FR 82480), and subsequently included it in the annual Candidate Notice of Review from 1983 through 1989, determining that listing *L. eltorensis* was warranted but precluded by other pending listing actions of a higher priority. We published a final

rule in the *Federal Register* listing *L. eltoroensis* as an endangered species on November 29, 1991 (56 FR 60933). On July 15, 1996, we published the *L. eltoroensis* Recovery Plan (USFWS 1996). We completed a 5-year status review on August 24, 2015 (USFWS 2015). Although the review did not recommend we reclassify or delist this orchid, it did indicate that the species was showing substantial improvement and a reduced level of threats.

Species Information

A thorough review of the taxonomy, life history, and ecology of *Lepanthes eltoroensis* is presented in the SSA report (Service 2019, entire), which is available at <http://www.regulations.gov> under Docket No. FWS–R4–ES–2019–0073, and summarized in this proposed rule.

Species Description

Lepanthes eltoroensis is a member of a large genus of more than 800 orchid species. Approximately 118 species in this genus are from the Caribbean and all but one are single-island endemics (Stimson 1969, p. 332; Barre and Feldmann 1991, p. 11; Tremblay and Ackerman 1993, p. 339; Luer 2014, p. 260). This species is a small, epiphytic orchid about 1.57 inches (in.) (4 centimeters (cm)) tall and is distinguished from other members of the genus by its obovate to oblanceolate leaves, ciliate sepals, and the length of the inflorescence (Vivaldi *et al.* 1981, p. 26; Luer 2014, p. 260). The inflorescence is a long (0.03 in.; 0.75 millimeters (mm)), peduncled raceme (flower cluster with flowers on separate short stalks) with reddish flowers. No more than two

flowers are produced at the same time, and the flowers are open on the inflorescence for about 10 days (Meléndez-Ackerman and Tremblay 2017, p. 1).

Life History

For purposes of the SSA, we considered *Lepanthes eltoroensis* to be a single metapopulation, the individual trees that host the *L. eltoroensis* plants as subpopulations, and the host tree aggregates as patches (USFWS 2019, p. 16). A number of characteristics (see below) suggest that a metapopulation approach may be appropriate to understand orchid population dynamics (see USFWS 2019, pp. 14–15) and epiphytic species (Snall *et al.* 2003, p. 567; Snall *et al.* 2004, p. 758; Snall *et al.* 2005, pp. 209–210), like *L. eltoroensis*. Metapopulations are defined as a set of subpopulations with independent local dynamics occupying discrete patches (Hanski 1999, entire; Hanski and Gaggiotti 2004, pp. 3–22), so that simultaneous extinction of all subpopulations is unlikely.

Populations of *Lepanthes* orchids exhibit high variance in reproductive potential, high variance in mean reproductive lifespan (Tremblay 2000, pp. 264–265), and few adults per population (Tremblay 1997a, p. 95). Less than 20 percent of individuals reproduce, and most subpopulations (60 percent of host trees) have fewer than 15 individuals. In addition, the distribution of individuals (seedling, juvenile, and adults) varies enormously among trees and is skewed towards few individuals per tree (Tremblay and Velazquez-Castro 2009, p. 214). The lifespan of *L. eltoroensis* can reach 30 to 50 years (Tremblay 1996, pp. 88–89, 114). However, the mean is 5.2 years, with an average percent mortality of 10 percent per year, although this varies greatly among life stages. Survival increases as individual orchids reach later life stages, but fewer plants reach

adulthood and have the opportunity to contribute offspring to the next generation (Tremblay 2000, p. 265; Rosa-Fuentes and Tremblay 2007, p. 207). Because distribution of the species is within a protected national forest, access to moss, dispersal ability, reproductive success, and lifespan influence survivorship more than other potential human-induced threats (Tremblay 2000, p. 265; Rosa-Fuentes and Tremblay 2007, p. 207).

The reproductive success of *Lepanthes eltoroensis* subpopulations is highly sensitive to temporal variation in environmental conditions (Tremblay and Hutchings 2002, entire). Further, reproductive success of *L. eltoroensis*, as in most orchids, is pollinator-limited (Tremblay *et al.* 2005, p. 6). This obligate cross-pollinated species (Tremblay *et al.* 2006, p. 78) uses a deceptive pollination system, typically characterized by very few reproductive events (~ less than 20 percent chance; Tremblay *et al.* 2005, p. 12). Although we do not know the pollinator for *L. eltoroensis*, elsewhere fungus gnats visit *Lepanthes* orchids (Blanco and Barboza 2005, p. 765) and pollinate by pseudocopulation; therefore, it is likely fungus gnats are a pollinator for *L. eltoroensis*. Fungus gnats do not travel far—perhaps tens of meters or even a few hundred meters (Ackerman 2018)—limiting pollen dispersal for *L. eltoroensis*. Most *L. eltoroensis* pollination occurs among individuals within a host tree, resulting in high inbreeding and low genetic variability (Tremblay and Ackerman 2001, pp. 55–58). The seeds of *L. eltoroensis* are wind-dispersed and require a mycorrhizal association for germination and survival until plants start photosynthesis (Tremblay and Ackerman 2001, p. 55; Tremblay 2008, p. 85).

Distribution and Abundance

Lepanthes eltoroensis is endemic to El Yunque National Forest (El Yunque), Puerto Rico. It is restricted to one general area within the Sierra Palm, Palo Colorado, and dwarf forests of the El Toro and Trade Winds trails (USFWS 2015, p. 5) at elevations above 2,461 feet (750 meters) (USFWS 1996, p. 2). At the time of listing, the species consisted of an estimated 140 individual plants. Since then, surveys have located additional individuals and subpopulations (groups of *L. eltoroensis* on the same host tree) resulting in a much greater estimate of individuals than at the time of listing. Surveys for *L. eltoroensis* have been infrequent, sparse, and done with varying spatial spread and methodology, making the results difficult to compare over time (USFWS 2019, pp. 34–52). However, partial surveys conducted periodically from 2000 to 2018 have found greater numbers of *L. eltoroensis* (USFWS 2019, pp. 49–50). In addition, surveys conducted between 2000 and 2005 indicated the subpopulations surveyed along El Toro Trail and Trade Winds Trail were relatively stable over the 5-year period (USFWS 2019, p. 39). The best available metapopulation estimate is 3,000 individual plants (Tremblay 2008, p. 90; USFWS 2015, p. 5). Overall, data collected for the SSA did not indicate a general pattern of population decline, but rather natural fluctuations (USFWS 2019, p. 52).

The metapopulation estimate was made prior to Category 5 Hurricane Maria making landfall on Puerto Rico in 2017. A post-hurricane partial survey along the El Toro Trail was completed in 2018, and found 641 total plants, including over 300 that had not been previously identified (Meléndez-Ackerman 2018, pers. comm.). We note that this was only a partial survey; there has never been a complete census of the entire metapopulation because most of the areas off the two main trails (El Toro and Trade

Winds) are dangerous and inaccessible. However, the forest types *Lepanthes eltoroensis* is most affiliated with – Palo Colorado, Sierra Palm, and Dwarf Forest – cover over 13,000 acres (ha) within the El Yunque (USFWS 2019, p. 8). Given the amount of unreachable habitat that has not been surveyed, all estimates are likely to underestimate the true abundance of the species (USFWS 2019, p. 50). Surveys of habitat outside traditional population sites (on or just off trails) could result in discovery of additional plants (Tremblay 2008, p. 90; USFWS 2019, pp. 18, 50, 73). In addition, since the time of listing, the species has faced multiple strong hurricanes (Hugo, Georges, Hortense, Irma, and Maria), and we currently know of more individuals than at the time of listing, indicating the species' abundance has remained stable (with all age classes represented and in good health) despite such events, and the species has the ability to recover from stochastic disturbances (USFWS 2019, pp. 51–52). Therefore, although the species and its habitat were harmed by the recent hurricanes (namely Maria), the previous estimate of 3,000 individual plants is still our best estimate.

Habitat

Lepanthes eltoroensis occurs on moss-covered trunks (i.e., host trees) within upper elevation cloud forests in the Sierra Palm, Palo Colorado, and Dwarf Forest associations of El Yunque (Luer 2014, p. 260; Ewel and Whitmore 1973, pp. 41–49), where humidity ranges from 90 to 100 percent, and cloud cover is continuous, particularly during the evening hours (55 FR 41248; October 10, 1990). Important habitat components seem to be elevation, adequate temperature and moisture regimes, open/semi-open gaps in the canopy, and presence of moss.

Regulatory and Analytical Framework

Regulatory Framework

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species is an “endangered species” or a “threatened species.” The Act defines an endangered species as a species that is “in danger of extinction throughout all or a significant portion of its range,” and a threatened species as a species that is “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” The Act requires that we determine whether any species is an “endangered species” or a “threatened species” because of any of the following factors:

- (A) The present or threatened destruction, modification, or curtailment of its habitat or range;
- (B) Overutilization for commercial, recreational, scientific, or educational purposes;
- (C) Disease or predation;
- (D) The inadequacy of existing regulatory mechanisms; or
- (E) Other natural or manmade factors affecting its continued existence.

These factors represent broad categories of natural or human-caused actions or conditions that could have an effect on a species’ continued existence. In evaluating these actions and conditions, we look for those that may have a negative effect on individuals of the species, as well as other actions or conditions that may ameliorate any negative effects or may have positive effects.

We use the term “threat” to refer in general to actions or conditions that are known to or are reasonably likely to negatively affect individuals of a species. The term “threat” includes actions or conditions that have a direct impact on individuals (direct impacts), as well as those that affect individuals through alteration of their habitat or required resources (stressors). The term “threat” may encompass—either together or separately—the source of the action or condition or the action or condition itself.

However, the mere identification of any threat(s) does not necessarily mean that the species meets the statutory definition of an “endangered species” or a “threatened species.” In determining whether a species meets either definition, we must evaluate all identified threats by considering the expected response by the species, and the effects of the threats—in light of those actions and conditions that will ameliorate the threats—on an individual, population, and species level. We evaluate each threat and its expected effects on the species, then analyze the cumulative effect of all of the threats on the species as a whole. We also consider the cumulative effect of the threats in light of those actions and conditions that will have positive effects on the species—such as any existing regulatory mechanisms or conservation efforts. The Secretary determines whether the species meets the definition of an “endangered species” or a “threatened species” only after conducting this cumulative analysis and describing the expected effect on the species now and in the foreseeable future.

The Act does not define the term “foreseeable future,” which appears in the statutory definition of “threatened species.” Our implementing regulations at 50 CFR 424.11(d) set forth a framework for evaluating the foreseeable future on a case-by-case basis. The term foreseeable future extends only so far into the future as the Services can

reasonably determine that both the future threats and the species' responses to those threats are likely. In other words, the foreseeable future is the period of time in which we can make reliable predictions. "Reliable" does not mean "certain"; it means sufficient to provide a reasonable degree of confidence in the prediction. Thus, a prediction is reliable if it is reasonable to depend on it when making decisions.

It is not always possible or necessary to define foreseeable future as a particular number of years. Analysis of the foreseeable future uses the best scientific and commercial data available and should consider the timeframes applicable to the relevant threats and to the species' likely responses to those threats in view of its life-history characteristics. Data that are typically relevant to assessing the species' biological response include species-specific factors such as lifespan, reproductive rates or productivity, certain behaviors, and other demographic factors.

Analytical Framework

We completed a comprehensive assessment of the biological status of *Lepanthes eltoroensis* and prepared a report of the assessment (SSA report), which provides a thorough account of the species' overall viability using conservation biology principles of resiliency, redundancy, and representation (collectively, the "3Rs"). We define viability here as the ability of the species to persist over the long term and, conversely, to avoid extinction. We have used the SSA report's assessment of *L. eltoroensis*' current and potential future conditions, based on the factors influencing the species and framed in the context of the 3Rs, to inform our understanding of risk to the species and our determination whether *L. eltoroensis* continues to meet the definition of an endangered species, whether it meets the definition of a threatened species, or whether it does not

meet the definition of either an endangered species or a threatened species (see **Determination**, below). In this discussion, we summarize the conclusions of that assessment, which can be accessed at <http://www.regulations.gov> under Docket No. FWS–R4–ES–2019–0073.

Lepanthes eltoroensis was listed as an endangered species in 1991, due to its rarity (Factor E), its restricted distribution (Factor E), forest management practices (Factor A), impacts from hurricane damage (Factor E), and collection (Factor B) (56 FR 60933, November 29, 1991, p. 56 FR 60935). The most important factor affecting *L. eltoroensis* at that time was its limited distribution. Additionally, its rarity made the species vulnerable to impacts from hurricanes, such as unfavorable microclimatic conditions resulting from numerous canopy gaps. Because so few individuals were known to occur, the risk of extinction was considered to be extremely high (56 FR 60933, November 29, 1991, p. 56 FR 60935).

Summary of Biological Status and Threats

In this section, we review the biological condition of the species and its resources, and the influence to assess the species' overall viability and the risks to that viability.

Risk Factors for Lepanthes eltoroensis

Forest Management Practices

At the time of listing (1991), El Yunque management practices such as establishment and maintenance of plantations, selective cutting, trail maintenance, and shelter construction were considered threats to *Lepanthes eltoroensis* (56 FR 60933, November 29, 1991, p. 56 FR 60935). The Recovery Plan further indicated that destruction and modification of habitat might be the most significant factors affecting the

number of individuals and distribution of the species (USFWS 1996, p. 5).

Since the species was listed, several laws have been enacted that provide protections to this species. In 1999, Commonwealth Law No. 241 (New Wildlife Law of Puerto Rico or *Nueva Ley de Vida Silvestre de Puerto Rico*) was enacted to protect, conserve, and enhance native and migratory wildlife species. This law requires authorization from the Puerto Rico Department of Natural and Environmental Resources (PRDNER) Secretary for any action that may affect the habitat of any species.

Furthermore, part of El Yunque (including the habitat where *Lepanthes eltoroensis* is currently known to occur) was congressionally designated as the El Toro Wilderness in 2005, to preserve its natural conditions, including species like *L. eltoroensis*, inhabiting the area (Caribbean National Forest Act of 2005 (Pub. L. 109–118); the Wilderness Act (16 U.S.C. 1131 *et seq.*); U.S. Forest Service (USFS) 2016, p. 32). The El Toro Wilderness consists of undeveloped USFS lands and is managed to preserve its natural conditions without any permanent improvements or human habitation (USFS 2016, p. 32). All known populations of *L. eltoroensis* occur within this wilderness area.

Scientists who have conducted research on *Lepanthes eltoroensis* do not consider destruction, curtailment, or modification of this species' habitat to be a factor threatening this species (Ackerman 2007, pers. comm.). In 2019, the USFS finalized a revised land and resources management plan to guide the general direction of El Yunque for the next 15 years. This plan specifically includes a set of standards and guidelines to protect the natural resources within the El Toro Wilderness, including listed species. Standards specific to the El Toro Wilderness include no salvaging of timber, no issuing permits for collection of plants or plant material unless for a scientific purpose, no new special-use

permits for facilities or occupancy, managing recreation to minimize the number of people on the trails, and no construction of new trails (USFS 2019, pp. 1, 32–35).

Standards and guidelines for at-risk (including listed) species detailed in the plan include not allowing collection of orchids unless approved for scientific purposes and making sure forest management activities are consistent with recovery plans (USFS 2019, p. 62).

Implementation of management practices in El Yunque has also improved; there is no selective cutting, and maintenance is minimal as both El Toro and Trade Winds trails receive few visitors. Mostly researchers and forest personnel use El Toro and Trade Winds trails; therefore, few human encounters are expected (USFS 2016, p. 32).

Additionally, the USFS coordinates with the Service to avoid or minimize impacts to a number of other federally listed species (e.g., Elfin-woods warbler, *Ilex sintenisii*) that co-occur within the same areas as *L. eltoroensis* as part of their management practices in accordance with section 7 of the Act.

There is no evidence suggesting current forest management practices are negatively affecting the species or its specialized habitat (adequate temperature and moisture regimes, and presence of moss) (USFWS 2019, p. 24). Furthermore, based on existing laws, we expect El Yunque will remain permanently protected as a nature reserve and be managed for conservation. Therefore, we no longer consider forest management practices or destruction and modification of habitat to be threats to the species.

Hurricanes

The extremely restricted distribution of *Lepanthes eltoroensis* makes it particularly vulnerable to large-scale disturbances, such as hurricanes and tropical storms,

which frequently affect islands of the Caribbean (NOAA 2018, unpaginated). Due to its geographic location, hurricanes are more frequent in the northeastern quadrant of Puerto Rico, where El Yunque is located (White *et al.* 2014, p. 30). Current global climate models are rather poor in simulating tropical cyclones; however, the Intergovernmental Panel on Climate Change's climate simulations suggest that the Caribbean will experience a decrease in tropical cyclone frequency, but an increase in the frequency of the most intense events (PRCC 2013, p. 10; USFWS 2019, p. 56).

Cloud forests, where this species occurs, are much taller than other vegetation and are higher in elevation, making them more exposed and more easily affected by high winds and in need of more time to recover post-disturbance (Hu and Smith 2018, p. 827). Heavy rains and winds associated with tropical storms and hurricanes cause tree defoliation, habitat modification due to falling of trees, and landslides (Lugo 2008, p. 368). Surveys conducted along El Toro Trail following Hurricane Maria in 2018 focused on assessing the impacts to the species and its host trees (subpopulations). Nineteen host trees were not found and assumed to be lost due to the hurricane. An additional nine host trees were found knocked down. In total, 641 plants, including seedlings, juveniles, and reproductive and non-reproductive adults, were found; 322 were found on previously marked host trees (including 191 individuals on those host trees that were knocked to the ground), and 319 were new individuals not previously surveyed (Melendez-Ackerman 2018, pers. comm.). Given that *Lepanthes eltoroensis* does not persist on felled or dead trees (Benítez and Tremblay 2003, pp. 67–69), we assume many of these 191 individuals (approximately 30 percent of individuals found) will not survive, resulting in the loss of those individuals from the metapopulation. However, based on previous efforts, we know

individual plants can be moved to new host trees and do quite well, highlighting the feasibility of relocation to increase the species' long-term viability in the context of severe hurricanes such as Hurricane Maria. University of Puerto Rico researchers translocated some of these 191 individuals, but because the translocations occurred months after the hurricane, we do not expect survival to be as high as if it had occurred immediately after the hurricane. Furthermore, this species has persisted from past hurricane events without active management of translocating species from felled host trees.

In addition, associated microclimate changes resulting from downed trees and landslides after severe storms (e.g., increased light exposure, reduction in relative humidity) may negatively affect the growth rate of *Lepanthes eltoroensis* populations (Tremblay 2008, pp. 89–90). Following Hurricane Georges in 1998, non-transplanted populations of *L. eltoroensis* had negative growth rates, while groups of plants that were transplanted to better habitats within the forest had positive growth rates (Benitez-Joubert and Tremblay 2003, pp. 67–69). Furthermore, based on data on related species, *L. eltoroensis* growth rates may be negatively affected by excess light from gaps caused by felled trees during hurricanes (Fernandez *et al.* 2003, p. 76).

The inherently low redundancy (the ability of a species to withstand catastrophic events) of *Lepanthes eltoroensis* due to its limited range makes hurricanes and tropical storms a primary risk factor. However, given the observed stable trend from past surveys and recent partial surveys in 2018 (USFWS 2019, pp. 39, 45–48), it appears that the species has the ability to recover from normal stochastic disturbances (USFWS 2019, pp. 51–52). Additionally, relocation has proven to be a viable conservation strategy for this

species (Benítez and Tremblay 2003, pp. 67–69). Relocating plants from fallen trees to standing trees following hurricane events results in higher survival of those transplanted individuals. This management strategy can improve and maximize species’ survival and reproductive success after hurricane events (Benítez and Tremblay 2003, pp. 67–69; Tremblay 2008, pp. 83–90). Following this recommendation, after Hurricane Maria, researchers from the University of Puerto Rico translocated some *L. eltoroensis* individuals along the El Toro trail. These individuals are currently being monitored to assess survival. In addition, since *L. eltoroensis* is part of the USDA Forest Service’s “Plant Species of Conservation Interest of El Yunque” (USFS 2018, p. 37) and is included in the 2016 revised Land and Resource Management Plan that details a management concept focused on conservation, particularly to protect unique ecological resources (USFS 2016, p.1), the USFS will continue to implement conservation actions, such as habitat protection, enhancement, and relocation of *L. eltoroensis* individuals following hurricanes as deemed necessary.

Collection

Collection for commercial or recreational purposes eliminated one population of *Lepanthes eltoroensis* prior to listing under the Act (56 FR 60933; November 29, 1991). The rarity of the species made the loss of even a few individuals a critical loss to the species as a whole.

The USFS regulations in title 36 of the Code of Federal Regulations at part 261, section 261.9 (36 CFR 261.9) prohibit collection of listed plant species in wilderness areas. Additionally, since the species was listed under the Act in 1991, other laws have been enacted that provide protections to the species from collection or removal.

Commonwealth Law No. 241 (New Wildlife Law of Puerto Rico or *Nueva Ley de Vida Silvestre de Puerto Rico*), enacted in 1999, protects, conserves, and enhances native and migratory wildlife species. Specifically, Article 5 of this law prohibits collection and hunting of wildlife species, including plants within the jurisdiction of Puerto Rico without a permit from the PRDNER Secretary. In 2004, *Lepanthes eltoroensis* was included in the list of protected species of Regulation 6766 (*Reglamento 6766 para Regir el Manejo de las Especies Vulnerables y en Peligro de Extinción en el Estado Libre Asociado de Puerto Rico*), which governs the management of endangered and threatened species within the Commonwealth of Puerto Rico. Article 2.06 of this regulation prohibits collecting, cutting, and removing, among other activities, listed plant individuals within the jurisdiction of Puerto Rico. *L. eltoroensis* will likely remain protected under Commonwealth laws and regulations even after it is delisted from the ESA. Commonwealth Regulation 6766 provides protection to species that are not federally listed or that have been removed from the ESA, and the species will remain protected under the Wilderness provisions from the 2016 revised Land and Resource Management Plan for El Yunque (USFS 2016, entire). According to this plan, any influences by humans on the natural process that take place in the wilderness area will be to protect threatened and endangered species in addition to human life (USFS 2016, p. 33). As such, the standards of the plan include conducting wildlife and plant habitat/population surveys and monitoring in a manner compatible with the goals and objectives of wilderness (USFS 2016, p. 34). Additional protection measures include not issuing forest product permits for collection of plants or plant material in wilderness areas (unless for scientific and educational purposes and approved by the forest

biologist/ecologist), and management strategies to design, construct, and maintain trails to the appropriate trail standard in order to meet wilderness standards protections (USFS 2016, p. 34).

Despite the one documented instance of collection, the threat of collection is low, given that few people venture into the El Toro Wilderness (Tremblay 2007, pers. comm.) and that the small size (less than 2 in. (4 cm) tall) and inconspicuousness of this species makes it easy to overlook (Ackerman 2007, pers. comm.; Tremblay 2007, pers. comm.). Additionally, this species is not used for commercial or recreational purposes and is not considered to have ornamental value (USFWS 2015, p. 8). Thus, there is no evidence that collection is currently impacting *Lepanthes eltoroensis* (USFWS 2019, p. 24) or likely to do so in the future.

Small Population Size and Low Reproduction

The smaller the population, the greater the probability that fluctuations in population size from stochastic variation (e.g., reproduction and mortality) will lead to extirpation. There are also genetic concerns with small populations, including reduced availability of compatible mates, genetic drift, and inbreeding depression. Small subpopulations of *Lepanthes eltoroensis* are particularly vulnerable to stochastic events, thus contributing to lower species' viability (USFWS 2019, p. 24).

Lepanthes eltoroensis may experience declining growth related to the distribution of individuals among host trees and demographic processes (e.g., reproductive success, survival), which can be negatively influenced by environmental and catastrophic risks (USFWS 2019, p. 25). Fruit production is limited; therefore, opportunities for establishment are limited. Less than 20 percent of individuals reproduce, and most

subpopulations (60 percent of host trees) have fewer than 15 individuals. In addition, the distribution of individuals (seedling, juvenile, and adults) varies enormously among trees and is skewed towards few individuals per tree (Tremblay and Velazquez-Castro 2009, p. 214). Despite small subpopulations of *L. eltoroensis* with limited distribution and naturally limited fruit production, this species has continued to persist even after regular exposure to disturbances. In addition, we now estimate the species population to be 3,000 individuals, which is a significant increase from the 140 individuals known at the time of listing. Therefore, the species' vulnerability to extinction is reduced.

Genetic Risks

The main genetic risk factor for the species is low genetic variability. The effective population size (number of individuals in a population who contribute offspring to the next generation) ranges from 3 to 9 percent of the standing population (number of individuals in a population) (Tremblay and Ackerman 2001, entire). In other words, for every 100 adults, maybe 9 will transfer genes to the next generation. In addition, although *Lepanthes eltoroensis* can survive for up to 50 years, most seedlings and juveniles die (Tremblay 2000, p. 264). Therefore, very few individuals are responsible for the majority of seed production, decreasing the genetic diversity as a whole in subpopulations (Meléndez-Ackerman and Tremblay 2017, pp. 5–6).

There is evidence for low gene flow in the species. Estimated gene flow in *Lepanthes eltoroensis* is less than two effective migrants per generation (the effective generation of the orchid) (Tremblay and Ackerman 2001, p. 54). This implies that most mating is among individuals within a host tree, potentially resulting in high inbreeding, low genetic variability, and inbreeding depression (Tremblay and Ackerman 2001, pp.

55–58). Low genetic diversity may be reflected in reduced genetic and environmental plasticity, and thus, low ability to adapt to environmental changes. If there are high rates of inbreeding, this could lead to inbreeding depression, and could have profound long-term negative impacts to the viability of the species (USFWS 2019, pp. 28-29). However, the species is likely an obligate cross-pollinated species (Tremblay *et al.* 2006, p. 78), which is a mechanism to reduce inbreeding. Additionally, this species has demonstrated the ability to adapt to changing environmental conditions (i.e., natural disturbances) over time (USFWS 2019, p. 54).

Effects of Climate Change

The average temperatures at El Yunque have increased over the past 30 years (Jennings *et al.* 2014, p. 4; Khalyani *et al.* 2016, p. 277). Climate projections indicate a 4.6 to 9 degrees Celsius (°C) (8.2 to 16.2 degrees Fahrenheit (°F)) temperature increase for Puerto Rico from 1960–2099 (Khalyani *et al.* 2016, p. 275). Additionally, projections indicate a decrease in precipitation and acceleration of the hydrological cycles resulting in wet and dry extremes (Jennings *et al.* 2014, p. 4; Cashman *et al.* 2010, pp. 52–54). In one downscaled model, precipitation is projected to decrease faster in wetter regions like the Luquillo Mountains, where El Yunque is located, and the central mountains of Puerto Rico (Khalyani *et al.* 2016, p. 274). In contrast, ongoing research suggests higher elevations may have a buffering effect on declining trends in precipitation (Bowden 2018, pers. comm.; USFWS 2019, pp.65-66). Downscaled modeling for Puerto Rico was based on three Intergovernmental Panel on Climate Change global emissions scenarios from the CMIP3 data set: mid-high (A2), mid-low (A1B), and low (B2) (Khalyani *et al.*

2016, p. 267). Under all of these scenarios, emissions increase, precipitation declines, temperature and total dry days increase, and subtropical rain and wet forests are lost, while all wet and moist forest types decrease in Puerto Rico; the differences in the scenarios depends on the extent of these changes and the timing of when they are predicted to occur (USFWS 2019, p.67).

The most important potential risk to *Lepanthes eltoroensis* is the projected shift of the life zones of Puerto Rico from humid to drier. This includes changes in relative area and distribution pattern of the life zones, and the disappearance of humid life zones (Khalyani *et al.* 2016, p. 275). Decreased rainfall in northeastern Puerto Rico (i.e., El Yunque) can cause migration, distribution changes, and potential extirpation of many species that depend on the unique environmental conditions of the rain forest (Weaver and Gould 2013, p. 62). These projections may have direct implications for *L. eltoroensis* because the acreage of the lower montane wet forest life zone it occupies could decrease, resulting in less habitat available for the species. Epiphytes like *L. eltoroensis* could experience moisture stress due to higher temperatures and less cloud cover with a rising cloud base, affecting their growth and flowering (Nadkarni and Solano 2002, p. 584). Due to its specialized ecological requirements and restricted distributions within the dwarf forest, *L. eltoroensis* could be more adversely impacted by the effects of climate change than other species with wider distribution (e.g., lower elevation species) and greater plasticity, thus, reducing its viability. Predictions of life zone changes are not expected to affect resiliency of *L. eltoroensis* until after mid-century, and predictions out to 2100 vary in severity of impact (USFWS 2019, p.69).

Another potential risk to *Lepanthes eltoroensis* is the increase in catastrophic hurricanes resulting from climate change. The persistence of *L. eltoroensis* through repeated past hurricanes and other storms suggests it has the ability to recover and adapt from disturbances, and relocation of individuals from blown-down host trees further accelerates the recovery of the species post-hurricane (USFWS 2019, p. 73). In fact, ongoing monitoring show an initial positive population growth rate of *L. eltoroensis* despite the loss of host trees following hurricane María (Melendez-Ackerman 2019, pers. comm.).

Overall we anticipate the range of *Lepanthes eltoroensis* to contract due to changes in climatic variables leading to loss of wet and tropical montane habitats, potentially exacerbated by an increase in the frequency and severity of hurricanes by the end of the century (2100). However, surveys outside of the areas where the species is traditionally searched, along with an associated habitat model, would help better predict the future viability of *L. eltoroensis* (USFWS 2019, p. 73). Although changes to precipitation and drought, temperature, and life zones are expected to occur on Puerto Rico, over the next 20 to 30 years they are not predicted to be substantial. Modeling shows dramatic changes to Puerto Rico through 2100, the divergence in these projections increases dramatically after mid-century, making projections beyond 20 to 30 years more uncertain (Khalyani et al. 2016, p. 275). Moreover, *L. eltoroensis* is found in a protected area where synergistically damaging forest management practices are unlikely to occur, and there is the requirement for implementation of conservation management practices to mitigate negative impacts such as those caused by hurricanes.

Summary of Current Condition

Viability is defined as the ability of the species to sustain populations in the wild over time. To assess the viability of *Lepanthes eltoroensis*, we used the three conservation biology principles of resiliency, representation, and redundancy (Shaffer and Stein 2000, pp. 306–310). Briefly, resiliency supports the ability of the species to withstand environmental and demographic stochasticity (for example, wet or dry, warm or cold years); representation supports the ability of the species to adapt over time to long-term changes in the environment (for example, climate changes); and redundancy supports the ability of the species to withstand catastrophic events (for example, droughts, hurricanes). In general, the more redundant and resilient a species is and the more representation it has, the more likely it is to sustain populations over time, even under changing environmental conditions.

Resiliency

Factors that influence the resiliency of *Lepanthes eltoroensis* include abundance and growth trends within host trees, and habitat factors such as elevation, slope, aspect, precipitation, temperature, canopy cover, and presence of moss, mycorrhizal fungi, and pollinators. Influencing those factors are elements of *L. eltoroensis*' ecology that determine whether populations can grow to maximize habitat occupancy, thereby increasing resiliency. Stochastic factors that have the potential to affect *L. eltoroensis* include impacts to its habitat from hurricanes and effects of climate change (i.e., changes in temperature and precipitation regimes). Beneficial factors that influence resiliency include the protected status of the species' habitat, as the known range of the species is entirely within the El Toro Wilderness and therefore protected from human-induced

habitat loss and collection.

The best available surveys of *Lepanthes eltoroensis* found that the number of individuals is greater than at the time of listing (Tremblay 2008, p. 90), approximately 3,000 individual plants. The distribution of *L. eltoroensis* has not been investigated outside of traditional areas (i.e., just off El Toro and Trade Wind Trails); however, some researchers suggest that additional populations may occur within suitable habitat outside El Toro Trail. In fact, additional individuals have been found near, but outside El Toro Trail (Tremblay 2008, p. 90). Assuming a metapopulation size of 3,000 individuals, and observed stable subpopulations from past surveys (including recent partial surveys in 2018), this suggests the species has the ability to recover from normal stochastic disturbances; thus, we consider the species to be moderately resilient.

Representation

We lack genetic and ecological diversity data to characterize representation for *Lepanthes eltoroensis*. In the absence of species-specific genetic and ecological diversity information, we typically evaluate representation based on the extent and variability of habitat characteristics across the geographical range. Because the species does not appear to have much physiological flexibility, given that it has a rather restricted distribution (cloud forests on ridges), representative units were not delineated for this species. Available data suggest that conditions are present for genetic drift and inbreeding (Tremblay 1997a, p. 92). However, the effect of a genetic drift on the species into the future is uncertain, and the most updated *L. eltoroensis* information shows that the species has the ability to adapt to changing environmental conditions (i.e., natural disturbances) over time. Furthermore, some of the factors that we concluded would

reduce representation at the time of listing, such as habitat destruction and collection, are no longer acting as stressors upon the species. Finally, because the population is significantly larger than was known at the time of listing, representation has improved.

Redundancy

Redundancy for *Lepanthes eltoroensis* is the total number and resilience of subpopulations and their distribution across the species' range. This species is endemic to El Yunque, and it has not been introduced elsewhere. Despite the presence of multiple subpopulations (i.e., host trees), these subpopulations are located within a narrow/restricted range at El Toro Wilderness Area and are all exposed to similar specific habitat and environmental conditions. Population surveys by Meléndez-Ackerman et al. (2018) accounted for at least 61 host trees or subpopulations prior to hurricane Maria. Of these, Meléndez-Ackerman et al. (2018) were not able to locate 19 host trees following the hurricane, and studies are ongoing to determine the species response from the disturbance. Although redundancy is inherently low due to the narrow range the species inhabits, it has persisted despite past natural disturbances (i.e., hurricanes, tropical storms, etc.), and is considered more abundant within its habitat than previously documented.

Projected Future Status

Lepanthes eltoroensis only occurs within the protected El Yunque lands where stressors—including forest management practices, urban development surrounding El Yunque, and overcollection—are not expected to be present or are expected to remain relatively stable and unlikely to affect the species in the future. Because *L. eltoroensis* occurs on protected lands managed by the USFS, it will benefit from their ongoing

conservation practices, which include the relocation of plants from fallen host trees after a hurricane as deemed necessary, to alleviate the negative impacts of these storm events. The effect of genetic drift on the species into the future is uncertain, but *L. eltoroensis* has thus far demonstrated the ability to adapt to changing environmental conditions (i.e., natural disturbances) over time (USFWS 2019, pp. 51-52). The primary stressor affecting the future condition of *L. eltoroensis* is current and ongoing climate change stressors (Meléndez-Ackerman and Tremblay 2017, p. 1) and the associated shifts in rainfall, temperature, and storm intensities. These stressors account for indirect and direct effects at some level to all life stages and across the species' range.

All of these climate change stressors are predicted to result in shifts in the distribution of life zones present on Puerto Rico, with some of the most dramatic impacts predicted to occur in the latter half of the century in the tropical and subtropical wet forests in which the species resides (USFWS 2019, p. 57). Key life-history factors that make this species vulnerable to climate change stressors are its restricted range within the tropical and subtropical wet forests within El Yunque and low subpopulation sizes (USFWS 2015, pp. 7–10). Given the relatively low genetic and environmental plasticity of the species, it potentially does not have the capacity to adapt to these predicted conditions (USFWS 2019, p. 52).

To examine the potential future condition of *Lepanthes eltoroensis*, we used three future scenarios based on climate change predictions for Puerto Rico (Khalyani *et al.* 2016, entire), which used global emission scenarios (mid-high (A2), mid-low (A1B), and low (B1) (Nakicenovic and Swart 2000, entire)) to capture a range of possible scenarios. Our assessment of future viability includes qualitative descriptions of the likely impacts

of climate change under the above three scenarios from the literature, and is intended to capture the uncertainty in the species' response to climate stressors, and the lack of information on abundance and growth rates.

Climate Change Predictions

Projections out to the year 2100 predict increases in temperature and decreases in precipitation, particularly in wetter regions like El Yunque (Khalyani *et al.* 2016, pp. 274–275). However, divergence in temperature and precipitation projections increases dramatically after mid-century, depending on the scenario (Khalyani *et al.* 2016, p. 275; USFWS 2019, pp. 59-62), making projections beyond 20 to 30 years uncertain. Given the average lifespan of the species (approximately 5 years), a period of 20 to 30 years allows for multiple generations and detection of any population changes. Additionally, the species has been listed for close to 30 years, so we have a baseline to understand how populations have performed in that period. Therefore, the “foreseeable future” used in this determination is 20 to 30 years.

Precipitation and Drought

In general, projections show similar patterns of changes in precipitation and drought intensity and extremes, although total changes were greater for the A2 scenario (Khalyani *et al.* 2016, pp. 272–273, 274; USFWS 2019, pp. 59-60). Under scenarios A2, A1B, and B1, annual precipitation is projected to decrease by 510 to 916 millimeters (mm) (20 to 36 in.), 354 to 842 mm (14 to 33 in.), and 312 to 619 mm (12 to 24 in.), respectively, by 2100. Current annual precipitation in Puerto Rico averages 745 to 4,346 mm (29 to 171 in.). However, differences in precipitation between the three scenarios were greater after the mid-century (Khalyani *et al.* 2016, p. 274). Before then decreases

in rainfall are expected to be far less; rainfall decreases are expected to be 0.0012 to 0.0032 mm per day per year through 2050 (PRCC 2013, p. 7). Additionally, for all three climate scenarios, significant decreases in precipitation for the northern wet forests are not predicted until after 2040 (USFWS 2019, p. 60). Furthermore, the U.S. Geological Survey projection for Puerto Rico predicts an overall drying of the island and a reduction in extreme rainfall occurrence; however, this model suggests higher elevations, like those supporting *L. eltoroensis*, may have a buffering effect on declining trends in precipitation (Bowden 2018, pers. comm.). Therefore, precipitation declines are not likely to occur in the area supporting *L. eltoroensis* during the foreseeable future. On the other hand, drought intensity increased steadily under all three scenarios, but with a gradual increase in drought extremes (Khalyani *et al.* 2016, pp. 274–275). This increase is linear for all three scenarios.

Temperature

By 2100, all three scenarios predict increases in temperature with increases of 7.5–9.0 °C (13.5–16.2 °F), 6.4–7.6 °C (11.5–13.4 °F), and 4.6–5.4 °C (8.3–9.7 °F) under the A2, A1B, and B1 scenarios, respectively (Khalyani *et al.* 2016, p. 275). However, like with precipitation, projected increases in temperature are not substantial until after 2040. Projections show only a 0.8 °C (1.4 °F) increase by mid-century under all three scenarios. These scenarios differentiate the most from each other in later time intervals (after 2040) (Khalyani *et al.* 2016, pp. 275, 277). However, we are not aware of any information that would indicate these air temperature increases will influence formation of the cloud cover over El Yunque, which could in turn impact interior temperatures and humidity of the forest, where *Lepanthes eltoroensis* is found.

Life Zones

Dramatic changes are projected in the life zone distributions in Puerto Rico, although the changes vary by life zone and are predicted to be much more significant after mid-century. Because life zones are derived from climate variables (e.g., precipitation and temperature), general changes in life zone distribution are similar to changes in climatic variables. For example, annual precipitation changes will result in shifts from rain, wet and moist zones to drier zones (Khalyani *et al.* 2016, p. 275), and changes in temperature will result in changes from subtropical to tropical. In general, decreasing trends were observed in the areas of wet and moist zones, while increasing trends were observed in dry zones under all three scenarios (Khalyani *et al.* 2016, pp. 275, 279). Under all scenarios, loss of subtropical rain and wet forests are observed, although decreasing trends were observed in the area of wet and moist zones, while increasing trends were observed in the areas of dry zones in all three scenarios. Additionally, the loss of wet and moist zones in the northeastern mountain area that supports *Lepanthes eltoroensis* is not predicted to be substantial, and the area remains relatively stable until after 2040 (USFWS 2019 p. 69). This may be due to possible buffering effects of elevation across the island.

In summary, changes to precipitation and drought, temperature, and life zones are expected to occur on Puerto Rico, but over the next 20 to 30 years, they are not predicted to be substantial. Although modeling shows changes to Puerto Rico through 2100, the divergence in these projections increases dramatically after mid-century, making projections beyond 20 to 30 years more uncertain.

These projected changes may have direct or at least indirect effects on *Lepanthes*

eltoroensis; however, viability of the species under all scenarios is expected to remain stable within the foreseeable future (USFWS 2019, p. 71). Potential direct effects include a reduced number of seedlings as the number of dry days increase, a reduced number of fruits as minimum average temperature increases, and a reduced number of adults as maximum temperature increases (Olaya-Arenas *et al.* 2011, p. 2042). Additionally, projected changes in hurricane frequencies (and associated habitat changes) may negatively affect the growth rate of *L. eltoroensis* populations (Tremblay 2008, pp. 89–90) due to increases in light penetration from defoliation. Indirect effects are related to potential changes in moss cover and composition due to temperature and precipitation changes. Data from related species showed that orchid density, growth, and establishment were positively associated with moss species richness (Crain 2012, pp. 15–16; Garcia-Cancel *et al.* 2013, p. 6). Therefore, a change in forest temperature and humidity could affect the establishment and distribution of moss and, thus, *L. eltoroensis* (USFWS 2019, p. 11).

Persistence of the species through repeated past hurricanes and other storms suggests the species has the ability to recover and adapt from disturbances, and relocation of individuals from blown-down host trees further accelerates the recovery of the species post-hurricane. In fact, many researchers at El Yunque have concluded that hurricanes are the main organizing force of the forests (USFWS 2019, p.71). The forests go through a cycle that averages 60 years, starting with great impact by winds and rain of a hurricane, and then 60 years of regrowth (Lugo 2008, p. 371). In those 60 years of regrowth, complete changes in the species that dominate the landscape can occur. Although the hurricane appears destructive, it can be constructive because it makes the area more

productive—it rejuvenates the forest (USFWS 2019, p. 71). Currently, El Yunque is at the initial phase of early succession following Hurricane Maria (2017), which produced severe tree mortality and defoliation, including *Lepanthes eltoroensis* host trees.

In general, we anticipate the range of the species may contract somewhat due to changes in climatic variables, although the loss of wet and moist zones in the northeastern mountain area that supports *Lepanthes eltoroensis* is not predicted to be substantial by mid-century (USFWS 2019, p. 66). The range contraction may be exacerbated by an increase in the frequency and severity of hurricanes. However, as the species occurs within El Yunque, synergistic negative effects of development and deleterious forest management practices are unlikely threats to the species in the future. Currently, *L. eltoroensis* and its habitat at the El Yunque are protected by Congressional designation of El Toro Wilderness Area (Forest Plan 2016, p. 32), thus precluding human disturbance. Because the El Yunque management plan includes a set of standards and guidelines to protect the natural resources within the El Toro Wilderness, including other co-occurring federally listed species (e.g., *Ilex sintenisii* and *Ternstroemia luquillensis*) (USFS 2019, pp. 1, 32–35), the Service anticipates continued implementation of conservation and management practices to improve the habitat of all species within the area, including actions to mitigate hurricane impacts.

Future Viability

Resiliency

Under all future scenarios, resiliency is projected to remain moderate through at least the next 20 to 30 years. As mentioned above, there is very little projected contraction of the wet and moist forests within this timeframe. Although increasing

catastrophic hurricanes are possible, relocation of plants can ameliorate some of these impacts.

Redundancy

Redundancy is expected to remain stable under all scenarios for the next 20 to 30 years, although this prediction is uncertain given the very limited range of the species and the lack of knowledge about the full extent of the species' range (i.e., no surveys conducted off the two main trails). However, *Lepanthes eltoroensis* has persisted through catastrophic events in the past, and we expect it to persist into the foreseeable future.

Representation

Because the species does not appear to have much physiological flexibility, given that it has a rather restricted distribution, representative units were not delineated for this species. The current condition of low genetic and environmental diversity, and little breadth to rely on if some plants are lost, is expected to continue under all scenarios, at least through the next 20 to 30 years. Available data suggest that conditions are present for genetic drift and inbreeding. However, *Lepanthes eltoroensis* has demonstrated the ability to adapt to changing environmental conditions (i.e., natural disturbances) over time.

Recovery and Recovery Plan Implementation

Section 4(f) of the Act directs us to develop and implement recovery plans for the conservation and survival of endangered and threatened species unless we determine that such a plan will not promote the conservation of the species. Recovery plans are not regulatory documents. Rather, they are intended to establish goals for long-term conservation of a listed species and define criteria that are designed to indicate when the

threats facing a species have been removed or reduced to such an extent that the species may no longer need the protections of the Act. Recovery plans also provide guidance to our Federal, State, and other governmental and nongovernmental partners on methods to minimize threats to listed species.

There are many paths to accomplishing recovery of a species, and recovery may be achieved without all criteria being fully met. For example, one or more criteria may have been exceeded while other criteria may not have been accomplished or become obsolete, yet the Service may judge that, overall, the threats have been minimized sufficiently, and the species is robust enough, to reclassify the species from endangered to threatened or perhaps delist the species. In other cases, recovery opportunities may be recognized that were not known at the time the recovery plan was finalized. These opportunities may be used instead of methods identified in the recovery plan.

Likewise, information on the species that was not known at the time the recovery plan was finalized may become available. The new information may change the extent that criteria need to be met for recognizing recovery of the species. Recovery of species is a dynamic process requiring adaptive management that may, or may not, fully follow the guidance provided in a recovery plan.

The following discussion provides a brief review of recovery planning and implementation for *Lepanthes eltoroensis*, as well as an analysis of the recovery criteria and goals as they relate to evaluating the status of this orchid.

The *Lepanthes eltoroensis* Recovery Plan was approved on July 15, 1996. The objective of the Recovery Plan is to provide direction for reversing the decline of this orchid and for restoring the species to a self-sustaining status, thereby permitting eventual

removal from the Federal List of Endangered and Threatened Plants (USFWS 1996, p. 8). However, the Recovery Plan provides only criteria for reclassifying the species from endangered to threatened (“downlisting”). The specific criteria are: (1) Prepare and implement an agreement between the Service and the USFS concerning the protection of *L. eltoroensis* within El Yunque, and (2) establish new populations capable of self-perpetuation within protected areas (USFWS 1996, p. 8). The plan also includes the following recovery actions intended to address threats to the species:

- (1) Prevent further habitat loss and population decline;
- (2) Continue to gather information on the species’ distribution and abundance;
- (3) Conduct research;
- (4) Establish new populations; and
- (5) Refine recovery criteria.

The following discussion provides specific details for each of these actions and the extent to which the recovery criteria have been met.

Recovery Action 1: Prevent further habitat loss and population decline

This action has been met. In the past, the species’ primary threat was identified as destruction and modification of habitat associated with forest management practices (e.g., establishment and maintenance of plantations, selective cutting, trail maintenance, and shelter construction; 56 FR 60933, November 29, 1991). As described above under “Forest Management Practices,” the best available data indicates that forest management practices are no longer negatively affecting *Lepanthes eltoroensis*. Furthermore, the area where the species is found is within a protected area (El Yunque), part of which is the El Toro Wilderness designated in 2005, where the land is managed to preserve its natural

conditions and species like *L. eltoroensis* (USFS 2016, p. 32). We expect this wilderness area will remain permanently protected as a nature reserve and be managed for conservation. Additionally, because this area is within a National Forest, the National Forest Management Act of 1976 (16 U.S.C. 1600 *et seq.*), requires El Yunque to develop management plans. As noted above, El Yunque plan specifically includes a set of standards and guidelines to protect the natural resources within the El Toro Wilderness. Moreover, Federal agencies are mandated to carry out programs for the conservation of endangered species under section 7 of the Act to ensure that any action authorized, funded, or carried out by a Federal agency is not likely to jeopardize the continued existence of a federally listed species. The USFS continually consults with the Service to avoid and minimize impacts to listed species and their habitat at El Yunque. *L. eltoroensis* shares habitat with other federally listed species (e.g., *Ilex sintenisii*, *Ternstroemia luquillensis*, and Elfin-woods warbler); thus, the USFS will continue to consult with the Service on projects that could affect listed species in this area. Additionally, since the species was listed in 1991, many more individuals have been found and observed growth has been stable with no documented decline in the population.

Recovery Action 2: Continue to gather information on the species' distribution and abundance

This action has been met. Since the species was listed in 1991, several surveys for *Lepanthes eltoroensis* have been conducted. Although these surveys have been infrequent, sparse, and done with varying spatial spread and methodology, making the results difficult to compare over time, even partial surveys have found greater numbers of

L. eltoroensis. Surveys have indicated stable growth rates. While the best available estimate of the metapopulation is 3,000 individuals, surveys likely underestimate the species' true abundance as suitable habitat off the two main trails are dangerous and mostly inaccessible, preventing additional surveys. Surveys of habitat outside traditional population sites may result in additional individuals.

Recovery Action 3: Conduct research

This action has been met; however we continue to conduct research on the species. Information has been collected throughout the years on the distribution and dispersion patterns of *Lepanthes eltoroensis* (Tremblay 1997a, pp. 85–96), variance in floral morphology (Tremblay 1997b, pp. 38–45), and genetic differentiation (Tremblay and Ackerman 2001, pp. 47–62). In 2016, the Service and the PRDNER provided funding to researchers at the University of Puerto Rico to evaluate the current population status of *L. eltoroensis* and model its demographic variation in response to climatic variability (i.e., temperature and relative humidity). This study is an effort to evaluate the influence that climate change will have on the persistence of this species in its environment. Results are anticipated to be available later in 2020 and will be factored into our final determination on this proposed rule. Data gathered during this project will also be used to characterize the microhabitat variation between areas with and without *L. eltoroensis* and develop a habitat selection model to evaluate the relationship between the presence and absence of plants and landscape-level variables such as elevation, forest type, aspect, and temperature. Additionally, these data will allow for development of a monitoring infrastructure to model the demographic responses of *L. eltoroensis* to climate variation. This research will update the distribution and status of *L. eltoroensis* within El

Yunque, and assess natural threats, particularly climate change, affecting these populations. However, the best available data indicates that the species is projected to remain viable, and the results of the additional surveys, while helpful information, is not required.

Recovery Action 4: Establish new populations

This action has not been met but is no longer necessary. At the time of listing, only 140 plants were thought to exist; we now estimate a population size of 3,000 individuals. The 2015 5-year status review of *Lepanthes eltoroensis* states that the action to establish new populations is not necessary at this time for the recovery of the species because additional sub-populations and individuals have been found since the species was listed (USFWS 2015, p. 5). Additionally, relocation of plants from fallen trees onto standing trees following hurricane events was found to be an effective management strategy to improve and maximize survival and reproductive success (Benítez and Tremblay 2003, pp. 67–69).

Recovery Action 5: Refine recovery criteria

This action has not been met but will no longer be necessary. The Recovery Plan states that as additional information on *Lepanthes eltoroensis* is gathered, it will be necessary to better define, and possibly modify, recovery criteria. Based on the information compiled in the SSA (USFWS 2019, entire) this orchid is projected to remain viable over time, such that it may no longer meet the definition of an endangered or threatened species (see **Determination**).

Recovery Criterion 1: Prepare and implement an agreement between the Service and the USFS concerning the protection of Lepanthes eltoroensis within El Yunque

This criterion has been partially met. Although there is not a specific agreement between the Service and the USFS concerning the protection of *Lepanthes eltoroensis*, the intent of this criterion – to provide long-term protection for the species – has been met. Existing populations and the species’ habitat are protected. As stated before, this orchid species occurs within the El Toro Wilderness area where habitat destruction or modification is no longer considered a threat to the species or its habitat. The implementation of management practices in the forest has improved, no selective cutting is conducted, and the USFS coordinates with the Service to avoid impacts to listed species as part of their management practices. Because this species overlaps with other listed species, the USFS will continue to consult on projects that may affect this area. Furthermore, Commonwealth laws and regulations protect the species’ habitat as well as the species from collection and removal. There is no evidence that *L. eltoroensis* or its habitat is being negatively impacted; therefore, a formal agreement between the Service and the USFS is not necessary for protecting this species.

Recovery Criterion 2: Establish new populations capable of self-perpetuation within protected areas

As stated under Recovery Action 4, we have found that the action to establish new populations is not necessary at this time for the recovery of the species because additional sub-populations and individuals have been found since the species was listed (USFWS 2015, p. 5). Additionally, relocation of plants is an effective management strategy to improve and maximize survival and reproductive success, as has been demonstrated after hurricane events (Benítez and Tremblay 2003, pp. 67–69).

Summary

The Recovery Plan for *Lepanthes eltoroensis* provided direction for reversing the decline of this species, thereby informing when the species may be delisted. The Recovery Plan outlined two criteria for reclassifying the species from endangered to threatened: (1) Prepare and implement an agreement between the Service and the USFS concerning the protection of *L. eltoroensis* within El Yunque, and (2) establish new populations capable of self-perpetuation within protected areas. Both of these criteria have been partially met or are no longer considered necessary. This species is protected by Commonwealth law and regulations, and will continue to be should the species no longer require Federal protection, and occurs within a protected wilderness area that will remain protected and managed using techniques that are beneficial for this and other co-occurring federally listed species. There is no evidence that *L. eltoroensis* or its habitat is being negatively impacted by forest management activities or will be in the future. Additionally, the designation of wilderness where the species occurs has eliminated the need for a formal agreement between the Service and the USFS to protect this species. Since the species was listed under the Act and the Recovery Plan was written, additional plants have been found; therefore, establishment of new populations is not necessary at this time for recovery. Additionally, the five recovery actions intended to address threats to the species have all been either met or determined to no longer be necessary for recovery.

Determination of Status of *Lepanthes eltoroensis*

Section 4 of the Act (16 U.S.C. 1533), and its implementing regulations (50 CFR part 424), set forth the procedures for determining whether a species meets the definition of “endangered species” or “threatened species.” The Act defines an “endangered

species” as a species that is in danger of extinction throughout all or a significant portion of its range, and a “threatened species” as a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The Act requires that we determine whether a species meets the definition of “endangered species” or “threatened species” because of any of the following factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence.

Status Throughout All of Its Range

After evaluating threats to the species and assessing the cumulative effect of the threats under the section 4(a)(1) factors, we note that more individuals are known to occur than at the time of listing. Additionally, the best metapopulation estimate of 3,000 individuals is likely an underestimate, as not all potential habitat has been surveyed. Despite the effects of a small population size, continued limited distribution, and evidence of low gene flow (Factor E), the species has persisted and adapted to changing environmental conditions. Forest management practices (Factor A) and collection (Factor B) are not currently a threat to this species, nor are they anticipated to negatively affect *Lepanthes eltoroensis* in the future. Although hurricanes (Factor E) have the potential to negatively impact growth rates and survival of *L. eltoroensis*, observed stable subpopulations, even after recent severe hurricanes, indicate this species has the ability to recover from these natural disturbances. Additionally, relocation of plants is a viable management strategy that can improve and maximize survival and reproduction success.

The greatest threat to the future of *L. eltoroensis* is current and ongoing effects of climate change factors (Factor E); however, while changes to precipitation and drought, temperature, and life zones are expected to occur on Puerto Rico, within the foreseeable future, they are not predicted to be substantial, and the viability of the species is expected to remain stable. We anticipate small population dynamics (Factor E) will continue to be a concern, as there is already evidence of genetic drift, but *L. eltoroensis* has demonstrated the ability to adapt to changing environmental conditions over time at population levels lower than they are currently or projected to be in the future.

The species was originally listed as an endangered species due to its rarity, restricted distribution, specialized habitat, and vulnerability to habitat destruction or modification, as well as because of collection for commercial/recreational uses. We find that these threats are no longer affecting the status of the species as they have been minimized or eliminated. Partial surveys over the past 18 years, including surveys following two strong hurricanes in 2018, indicate there are more individuals than known at the time of listing, and the population appears to be relatively stable. Surveys are limited to detections right on the trails, or a very short distance from the trails. Habitat that has not or cannot be surveyed may hold additional subpopulations; therefore, surveys likely underestimate the true abundance of this species. The habitat at El Yunque, where the species occurs, is a designated wilderness area, and managed for its natural conditions; therefore, habitat modification or destruction is not a current threat. In addition, collection is prohibited under USFS regulations, and there is no indication this is a current threat to the species. Persistence of the species through repeated past strong hurricanes indicates the species has the ability to recover and adapt from disturbances.

Furthermore, relocation of individuals from felled trees further accelerates the recovery of the species post-hurricane. While a narrow endemic, the species has continued to exist across its historical range with all life stages represented and in good health. While projections predict increasing temperatures and decreasing precipitation over time into the future, projected impacts to the species' habitat (e.g., life zone changes) are not expected to be significant within the foreseeable future (USFWS 2019, p. 69). Recent, yet unpublished downscaled climate modelling (Bowden 2018, pers. comm.) indicates that higher elevation areas, like those supporting *L. eltoroensis*, may be buffered from the more generally predicted level of precipitation changes. This species has also demonstrated the ability to adapt to changes in its environment. Since the species was listed, warming temperatures have been documented and precipitation levels have decreased, yet the species has persisted. Additionally, following strong hurricanes that affected the species' habitat, abundance has remained stable, with all age classes represented and in good health. While suitable habitat conditions for the species may contract some over the foreseeable future, the species is likely to continue to maintain close to current levels of resiliency, redundancy, and representation. We conclude that there are no existing or potential threats that, either alone or in combination with others (i.e., forest management practices, climate change, and hurricane damage), are likely to cause the species' viability to decline. Thus, after assessing the best available data, we conclude that *L. eltoroensis* is not in danger of extinction throughout its range (i.e., meets the definition of an endangered species) or likely to become so within the foreseeable future (i.e., meets the definition of a threatened species).

Status Throughout a Significant Portion of Its Range

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so within the foreseeable future throughout all or a significant portion of its range.

Having determined that *Lepanthes eltoroensis* is not in danger of extinction or likely to become so within the foreseeable future throughout all of its range, we now consider whether it may be in danger of extinction or likely to become so within the foreseeable future in a significant portion of its range. The range of a species can theoretically be divided into portions in an infinite number of ways, so we first screen the potential portions of the species' range to determine if there are any portions that warrant further consideration. To do the "screening" analysis, we ask whether there are portions of the species' range for which there is substantial information indicating that: (1) The portion may be significant; and (2) the species may be, in that portion, either in danger of extinction or likely to become so in the foreseeable future. For a particular portion, if we cannot answer both questions in the affirmative, then that portion does not warrant further consideration and the species does not warrant listing because of its status in that portion of its range. Conversely, we emphasize that answering both of these questions in the affirmative is not a determination that the species is in danger of extinction or likely to become so in the foreseeable future throughout a significant portion of its range—rather, it is a step in determining whether a more detailed analysis of the issue is required.

If we answer these questions in the affirmative, we then conduct a more thorough analysis to determine whether the portion does indeed meet both of the "significant portion of its range" prongs: (1) The portion is significant; and (2) the species is, in that portion, either in danger of extinction or likely to become so in the foreseeable future.

Confirmation that a portion does indeed meet one of these prongs does not create a presumption, prejudgment, or other determination as to whether the species is an endangered species or threatened species. Rather, we must then undertake a more detailed analysis of the other prong to make that determination. Only if the portion does indeed meet both prongs would the species warrant listing because of its status in a significant portion of its range.

We evaluated the range of the *Lepanthes eltoroensis* to determine if any area may be a significant portion of the range. The species is a narrow endemic that functions as a single, contiguous population (with a metapopulation structure) and occurs within a very small area (El Yunque, Puerto Rico). Every threat to the species in any portion of its range is a threat to the species throughout all of its range, and so the species has the same status under the Act throughout its narrow range. Therefore, we conclude, based on this screening analysis, that the species is not in danger of extinction or likely to become so in the foreseeable future in any significant portion of its range. Our conclusion—that we do not undertake additional analysis if we determine that the species has the same status under the Act throughout its narrow range—is consistent with the courts’ holdings in *Desert Survivors v. Department of the Interior*, No. 16-cv-01165-JCS, 2018 WL 4053447 (N.D. Cal. Aug. 24, 2018); *Center for Biological Diversity v. Jewell*, 248 F. Supp. 3d , 946, 959 (D. Ariz. 2017); and *Center for Biological Diversity v. Everson*, 2020 WL 437289 (D.D.C. Jan. 28, 2020).

Determination of Status

Our review of the best available scientific and commercial data indicates that *Lepanthes eltoroensis* does not meet the definition of an endangered species or a

threatened species in accordance with sections 3(6) and 3(20) of the Act. Therefore, we propose to remove this species from the Federal List of Endangered and Threatened Plants.

Effects of this Proposed Rule

This proposal, if made final, would revise 50 CFR 17.12(h) to remove *Lepanthes eltoroensis* from the Federal List of Endangered and Threatened Plants. Therefore, revision of the species' recovery plan is not necessary. The prohibitions and conservation measures provided by the Act, particularly through sections 7 and 9, would no longer apply to this species. Federal agencies would no longer be required to consult with the Service under section 7 of the Act in the event that activities they authorize, fund, or carry out may affect *L. eltoroensis*. There is no critical habitat designated for this species.

Post-Delisting Monitoring

Section 4(g)(1) of the Act requires us to monitor for not less than 5 years the status of all species that are delisted due to recovery. Post-delisting monitoring refers to activities undertaken to verify that a species delisted due to recovery remains secure from the risk of extinction after the protections of the Act no longer apply. The primary goal of PDM is to monitor the species to ensure that its status does not deteriorate, and if a decline is detected, to take measures to halt the decline so that proposing it as an endangered or threatened species is not again needed. If at any time during the monitoring period data indicate that protective status under the Act should be reinstated, we can initiate listing procedures, including, if appropriate, emergency listing. At the conclusion of the monitoring period, we will review all available information to

determine if relisting, the continuation of monitoring, or the termination of monitoring is appropriate.

Section 4(g) of the Act explicitly requires that we cooperate with the States in development and implementation of PDM programs. However, we remain ultimately responsible for compliance with section 4(g) and, therefore, must remain actively engaged in all phases of PDM. We also seek active participation of other entities that are expected to assume responsibilities for the species' conservation after delisting. The Service is currently coordinating with PRDNER and USFS on the completion of the PDM.

We have prepared a draft PDM plan for the orchid, *Lepanthes eltoroensis*. The plan is designed to detect substantial declines in the species, with reasonable certainty and precision, or an increase in threats. The plan:

- (1) Summarizes the species' status at the time of proposed delisting;
- (2) Defines thresholds or triggers for potential monitoring outcomes and conclusions;
- (3) Lays out frequency and duration of monitoring;
- (4) Articulates monitoring methods, including sampling considerations;
- (5) Outlines data compilation and reporting procedures and responsibilities; and
- (6) Proposes a PDM implementation schedule, funding, and responsible parties.

Concurrent with this proposed delisting rule, we announce the availability of the draft PDM plan for public review at <http://www.regulations.gov> under Docket No. FWS–R4–ES–2019–0073. The plan can also be viewed in its entirety at <https://www.fws.gov/southeast/caribbean/>. Copies can also be obtained from the U.S.

Fish and Wildlife Service, Caribbean Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**). We seek information, data, and comments from the public regarding *Lepanthes eltoroensis* and the PDM plan. We are also seeking peer review of the draft PDM plan during this proposed rule's comment period. We anticipate finalizing this plan, considering all public and peer review comments, prior to making a final determination on the proposed delisting rule.

Required Determinations

Clarity of the Rule

We are required by Executive Orders 12866 and 12988 and by the Presidential Memorandum of June 1, 1998, to write all rules in plain language. This means that each rule we publish must:

- (1) Be logically organized;
- (2) Use the active voice to address readers directly;
- (3) Use clear language rather than jargon;
- (4) Be divided into short sections and sentences; and
- (5) Use lists and tables wherever possible.

If you feel that we have not met these requirements, send us comments by one of the methods listed in **ADDRESSES**. To better help us revise the rule, your comments should be as specific as possible. For example, you should tell us the numbers of the sections or paragraphs that are unclearly written, which sections or sentences are too long, the sections where you feel lists or tables would be useful, etc.

National Environmental Policy Act (42 U.S.C. 4321 et seq.)

We determined that we do not need to prepare an environmental assessment or an environmental impact statements, as defined under the authority of the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq.*), in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act. We published a notice outlining our reasons for this determination in the *Federal Register* October 25, 1983 (48 FR 49244).

Government-to-Government Relationship With Tribes

In accordance with the President's memorandum of April 29, 1994 (Government-to-Government Relations with Native American Tribal Governments; 59 FR 22951), Executive Order 13175 (Consultation and Coordination With Indian Tribal Governments), and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. We have determined that there are no tribal interests affected by this proposal.

References Cited

A complete list of references cited in this rulemaking is available on the Internet at <http://www.regulations.gov> under Docket No. FWS-R4-ES-2019-0073 and upon request from the Caribbean Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this proposed rule are the staff members of the Service's Species Assessment Team and the Caribbean Ecological Services Field Office.

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Proposed Regulation Promulgation

Accordingly, we propose to amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—ENDANGERED AND THREATENED WILDLIFE AND PLANTS

1. The authority citation for part 17 continues to read as follows:

AUTHORITY: 16 U.S.C. 1361-1407; 1531-1544; and 4201-4245, unless otherwise noted.

§ 17.12 [Amended]

2. Amend § 17.12(h) by removing the entry for “*Lepanthes eltoroensis*” under FLOWERING PLANTS from the List of Endangered and Threatened Plants.

Dated: January 23, 2020

Signed:

Aurelia Skipwith

Director, U.S. Fish and Wildlife Service.

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